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(54) **Appliance for implant work on the jaw/dentline or other part of the body.**

(57) In connection with implant work on the dentline, use is made of a machining instrument which is provided with an attachment part (31) for attachment to a rotary unit. The machining instrument can alternatively be applied in an extension unit which in turn can be applied to the rotary unit in a corresponding manner to the machining instrument. The extension unit has a thickened central section (17c) which is provided with a recess or opening (24), in which an inclined surface (29) is arranged. In the applied position of a machining instrument, one surface (30) of its attachment part is set against the inclined surface (29). A rotationally-fixed cooperation is present between the extension unit and the machining instrument. Moreover, a locking effect is achieved between the extension unit and the machining instrument as a result of a secure wedging effect obtained by means of the inclined surface. The rotary movement transmitted from the rotary unit to the extension unit is in turn transmitted to the machining instrument, which moreover is secured in the longitudinal displacement direction.

EP 0 454 639 A1

1

EP 0 454 639 A1

2

TECHNICAL FIELD

The present invention relates to an appliance for reducing the number of different lengths needed in machining instruments, in the form of drills, grinding instruments, etc. in connection with implant work on the jaw/dentine or other part of the body. Each machining instrument is designed with a part for attachment to a rotary unit (tool), by means of which each machining instrument can be rotated.

PRIOR ART

On account of differences in the drilling (machining) depth and variable accessibility in implant work, there is a requirement for equipment permitting considerable variation in the lengths of the machining instruments/drills. Sets comprising a large number of machining instruments/drills have therefore been made available hitherto, from which sets instruments/drills of a suitable length have been chosen as the work progresses. A large number of machining instruments complicates the work and is moreover expensive to provide.

The present invention makes use of the knowledge that one or more extension units between the rotary unit and each machining instrument can reduce the number of lengths needed in the machining instruments.

DETAILS OF THE INVENTION

TECHNICAL PROBLEM

The invention proposes an extension unit for the machining instruments. The extension unit will itself be available in several lengths, if so desired. The extension unit will be easy to arrange in the rotary unit and will be able to receive and bear, at least in a rotationally fixed manner, machining instruments of different types and lengths. The functioning will be simple and straightforward from the handling point of view, so that a reliable anchoring of the extension unit in the rotary unit and of each machining instrument in the extension unit can be achieved at all times. The extension unit must have a smooth structure which does not have an adverse effect on the work being carried out. In addition, its manufacture will be technically simple and economically attractive.

SOLUTION

The present invention proposes an appliance which resolves the problems mentioned above. The appliance comprises an extension unit which, at its first end, is designed with or is connected to an attachment part which corresponds to the attachment part on each machining instrument and via which the

extension unit can be applied in and can be rotated by means of the rotary unit. The extension unit is moreover designed with a bearing recess extending from its other end for each machining instrument which can be inserted into the bearing recess via its attachment part for producing a rotationally fixed cooperation between the attachment part and the extension part via a surface on the attachment part and an actuation surface in the extension unit. The extension unit is preferably designed with a section situated between the first and second ends, via which section the longitudinal insertion position of each machining instrument in the extension unit can be indicated, and each machining instrument applied in the unit can be acted upon in conjunction with its separation from the extension unit.

In one embodiment, the said actuation surface also forms a secure wedging surface, by means of which each machining instrument can be locked in its longitudinal displacement direction. Seen in the longitudinal and transverse directions of the extension unit, the actuation surface is preferably designed straight. It can cooperate with a similarly straight and appposable surface on the attachment part of each machining instrument. Moreover, the actuation surface is inclined in the insertion direction and widens towards the other end of the extension unit at a small angle which can be chosen from within the range of 2-6°. The angle is preferably about 4°. The appposable surface on the attachment part of each machining instrument extends essentially parallel to the longitudinal axis of the machining instrument. By using the said section, which is preferably thickened in relation to the other parts of the extension unit, an opening can be arranged in connection with the said combined rotational actuation and secure wedging surface. The opening affords the possibility of visual indication of the insertion position of each machining instrument in the extension unit. The opening also provides for a simple separation possibility for an applied machining instrument. The opening also means that the actuation surface can be given a position which is advantageous from the production point of view. The opening is preferably made by means of an inclined segment-shaped cutting being milled in the section. The bearing recess is preferably arranged centrally in the extension unit, along whose longitudinal axis the recess extends towards the said opening. By means of the incline of the said recess/opening, the said inclined surface widening towards the other end of the extension unit can be obtained.

The extension unit is preferably made with two cylindrical parts which project from each side of the said section. The cylindrical part supporting the attachment part of the extension unit is designed with a first, preferably smallest diameter. The part supporting the bearing recess is designed with a diameter which exceeds the said first diameter. The section has

3

EP 0 454 639 A1

4

a diameter or a peripheral dimension which exceeds the second diameter.

ADVANTAGES

The design proposed affords a smooth, easy-to-handle and reliably functioning extension unit which substantially reduces the number of machining instruments in sets used. The reduction in machining instruments and the economical production of the extension unit as such affords good overall economy in the use in medical care. Handling is extremely simple by virtue of the fact that the extension unit is applied in the rotary unit in the same way as each machining instrument. Each machining instrument can be inserted easily into the extension unit and can be securely arranged in the extension unit by means of the secure wedging principle used. The separation of each machining instrument from each extension unit can be carried out easily, for example by virtue of the fact that a finger, tool, etc. can be easily applied via the said opening for bringing about the separation. The use of the said inclined surface can result in the machining instrument becoming slightly out-of-line about its axis of rotation. However, this has no importance, since the work in question involves rotating at a low speed, for example about 2000 rpm. The extension unit can be produced from a single piece which has a thicker central section and two essentially cylindrical parts, of which the one is made with attachment members and the other with a bearing recess. The central section is provided with an inclined and advantageously sector-shaped opening giving onto one side of the unit.

DESCRIPTION OF FIGURES

An at present proposed embodiment of an appliance having the features characteristic of the invention will be described below with reference to the attached drawings, in which:

Figure 1 shows a basic diagram of parts of a known rotary unit,

Figure 2 shows, from the side, a first type of machining instrument, in which respect one machining instrument has been shown separate and one machining instrument has been shown applied to an extension unit,

Figure 3 shows a second type of machining instrument, in which respect the machining instruments themselves are available in a number of lengths (for example 4) and each machining instrument can in turn be applied to an extension unit,

Figure 4 shows a third type of machining instrument which is shown separate and also applied to an extension unit,

Figure 5 shows a fourth type of machining instrument (cf. Fig. 3),

Figure 6 shows in a longitudinal section a detailed design of the extension unit,

Figure 7 shows a first end view of the unit according to Figure 6, and

Figure 8 shows a second end view of the unit according to Figure 6.

DETAILED DESCRIPTION OF THE INVENTION

Figure 1 shows the head of a rotary unit 1 which is, known per se and which is designed to support different types of machining tools/drills 2-12 according to Figures 2-5. Each machining instrument of machining instruments 2-12 comprises an attachment part 2a which is designed with a rear flange 13 and a depression (groove) 14 arranged behind the latter. Each machining instrument comprises a head 15 with associated part 16 effecting the machining. Since the machining instruments themselves, like the rotary unit, are already well known, they will not be described in detail here. Each machining instrument can be applied in an extension unit 17. The basic design of the extension unit is the same in Figures 2-5, for which reason only the extension unit in Figure 2 will be described in detail. The extension unit 17 is designed with an attachment part 17a which in principle corresponds to the design of the attachment part 2a in each machining instrument. In this way the attachment part can be applied in the rotation unit 1 in a manner corresponding to each machining instrument. The rear flange on the attachment part of the extension unit has been given the reference 18 and the following groove reference 19. The extension unit supports the machining instrument 2' at its end 17b in accordance with what is stated below.

Figure 2 shows that it is possible to obtain different (two) drill lengths L and L' by means of a machining instrument 2 and an extension unit 17. In the first-mentioned case, the machining instrument is applied directly in the rotary unit 1 and in the last-mentioned case the machining instrument is applied in the extension unit which in turn is applied or has been applied in the rotary unit 1.

Figure 3 shows that it is possible to obtain seven different machining instrument lengths by means of four machining instruments 3, 4, 5 and 6 and one extension unit 17'.

Figure 4 shows that it is possible to obtain three different machining instrument lengths by means of two machining instruments 7, 8 and one extension unit.

Figure 5 shows a case corresponding to the case according to Figure 3. Figures 2-5 also show different types of machining instruments.

According to Figure 6, the extension unit is made up of a first cylindrical part 20 with a diameter D1, a second cylindrical part 21 with a second diameter D2 and a section 17c arranged between the parts 20 and

5

EP 0 454 639 A1

6

21. As emerges from Figures 6 and 8, a segment-shaped part is removed from the cylindrical section 20. The length of the removed part is indicated by a. By means of the segment-shaped recess, a surface 22 is formed which is straight in the longitudinal and transverse directions of the extension unit. A bearing recess 23 extends centrally and in the longitudinal direction of the extension unit. The section 17c is provided with an opening 24 which has been produced by means of an inclined recess/cutting, whose wall is indicated by 25. The recess is inclined so that its axis 26 slopes in relation to the perpendicular 27 of the longitudinal axis 28 of the extension unit. The bottom surface 29 of the hole thus slopes in relation to the said longitudinal axis 28. The said bottom surface 29 is preferably straight in the essential longitudinal and transverse directions of the extension unit and in addition slopes in the longitudinal section shown in Figure 6 in relation to the said longitudinal axis 28. The surface widens towards the said second end 17b'. The degree of sloping can be within the range of 2-6°, and in the case shown it is chosen to be about 4°. The said central section 17c is preferably thicker than the parts 20 and 21. In a preferred embodiment, the diameter D1 is smaller than the diameter D2, which in turn is smaller than the diameter D3 (in the circular central section 17c) or peripheral dimension (in the non-circular central section) of the central section 17c.

A surface 30 on an attachment part 31 on a machining instrument applied in the extension unit can be set against the inclined or sloping surface 29. The surface 30 has in principle a corresponding design to the surface 22 on the extension unit. The surface 30 is thus straight in the longitudinal and transverse directions of the machining instrument and is moreover essentially parallel to the longitudinal axis 28 in the longitudinal section shown in Figure 6. The straight surfaces 29 and 30 therefore form a rotationally fixed contact between the extension unit and the machining instrument applied in the latter. As a result of the incline or slope of the surface 29, a locking effect is also achieved in the longitudinal direction of the machining instrument, which coincides with the longitudinal axis 28. The machining instrument in question can be pressed into its position shown in Figure 6 by taking hold of the head of the machining instrument (cf. 15 in Figure 2) and moving the machining instrument into the recess 23 via its attachment part 31. The opening affords a visual indication of the longitudinal displacement position of the machining instrument in relation to the extension unit. The opening/recess 24 can also serve as a separation access point upon separation of the machining instrument from the extension unit. The cutting or recess 24 is designed in such a way that it extends from the outside (outer surface) 32 of the section 17c down under the centre axis 28. The recess 23 makes contact with the recess 24 at their inner parts. A segment-shaped,

radially extending surface 33 is arranged at the transition.

The extension unit is about 30 mm long and the recess 24 has a length of about 3 mm. The approximate values for the diameters D1-D3 are 2.35, 3.5 and 5.5 respectively. The recess 23 is designed in such a way that it affords good guiding of each machining instrument.

The invention is not limited to the embodiment shown above by way of example, but can be subjected to modifications within the scope of the following patent claims and the inventive concept.

Claims

1. Appliance for reducing the number of different lengths (L, L') needed in machining instruments (2-12) in the form of drills, grinding instruments, etc. in connection with implant work on the jaw/dentine or other part of the body, in which respect each machining instrument is designed with a part (2a, 31) for attachment to a rotary unit, by means of which each machining instrument can be rotated, characterized in that it comprises an extension unit (17) which at its first end (17a) is designed with or is connected to an attachment part (18, 19) which corresponds to the attachment part (13, 14) on each machining instrument and via which the extension unit can be applied in and can be rotated by means of the rotary unit, in that the extension unit is designed with a bearing recess (23) extending from its other end for each machining instrument, which can be inserted into the bearing recess via its attachment part (31) for creating a rotationally-fixed cooperation between the attachment part and the extension unit via a surface (30) on the attachment part and an actuation surface (29) in the extension unit, and in that the extension unit is preferably designed with a section (17c) situated between the first and second ends, via which section the longitudinal insertion position of the machining instrument in the unit can be indicated and/or each machining instrument applied in the unit can be acted upon in conjunction with its separation from the extension unit.
2. Appliance according to patent claim 1, characterized in that the actuation surface (29) of the extension unit also forms a secure wedging surface, by means of which each machining instrument can be locked in its longitudinal displacement direction.
3. Appliance according to patent claim 1 or 2, characterized in that the actuation surface (29) is essentially straight in the longitudinal and trans-

7

EP 0 454 639 A1

8

verse directions of the extension unit and can cooperate with a corresponding and essentially straight appposable surface (30) on the attachment part of each machining instrument, and in that in a longitudinal section through the extension unit the actuation surface widens towards the other end of the extension unit by 2-6°, preferably by about 4°, and in that the said appposable surface on the said attachment part extends essentially parallel to the longitudinal axis of the machining instrument.

forms a recess extending centrally in the extension unit in the longitudinal direction, which recess at its inner end merges into the said opening (24).

4. Appliance according to any one of the preceding patent claims, characterized in that the said section is designed with an opening (24), via which visual indication can be effected and/or via which the possibility of the said separation is afforded, and in that the actuation surface is situated at the said opening (24) in order to be easily formed upon manufacture.

5. Appliance according to any one of the preceding patent claims, characterized in that each attachment part comprises a flange (18/13) situated at the first end of the extension unit/machining instrument, and a depression (19/14) arranged behind the flange, and in that a segment-shaped part is removed in order to establish a surface which is straight in the longitudinal and transverse directions.

6. Appliance according to any one of the preceding patent claims, characterized in that the extension unit, at its part (20) supporting the first end, is essentially cylindrical and has a first diameter (D1), in that the extension unit, at its part (21) supporting the other end, is essentially cylindrical and has a second diameter (D2), which exceeds the first diameter, and in that the said section (17c) on the extension unit is designed with a third diameter (D3) or external peripheral dimension which largely exceeds the second diameter.

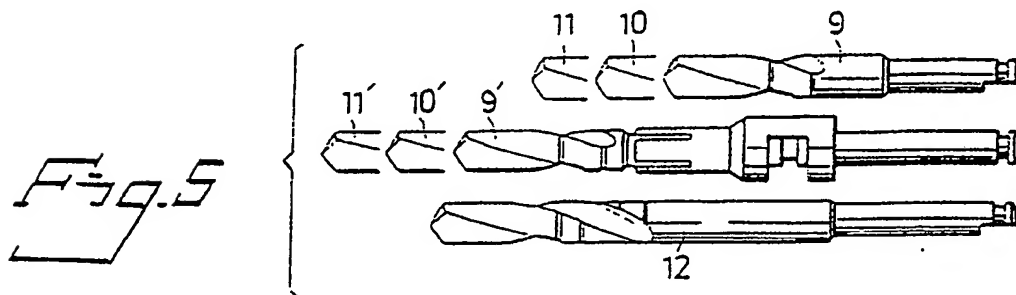
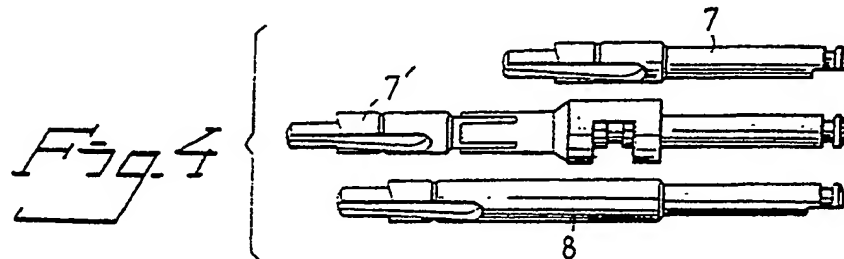
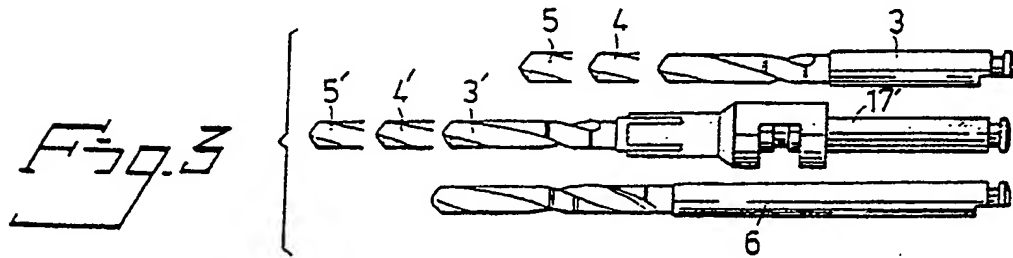
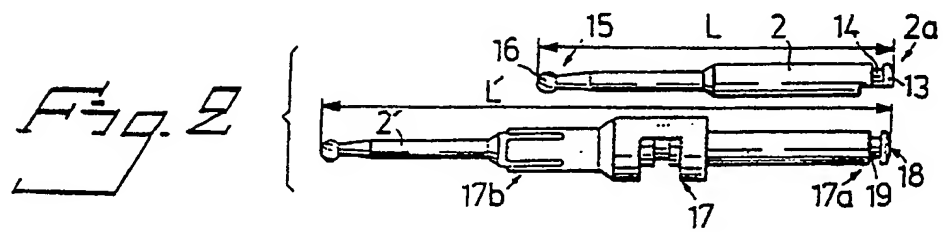
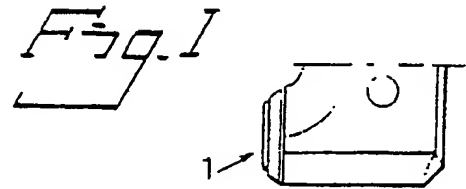
7. Appliance according to patent claim 4, 5 or 6, characterized in that the said section is provided with a segment-shaped recess which is inclined towards the longitudinal axis of the extension unit in relation to the perpendicular and forms the said opening (24).

8. Appliance according to patent claim 7, characterized in that the segment-shaped recess slopes 2-6°, preferably about 4°, in relation to the perpendicular, as seen in a longitudinal section through the extension unit.

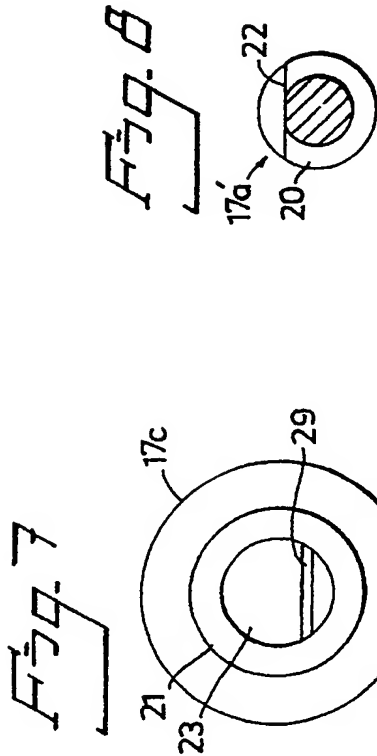
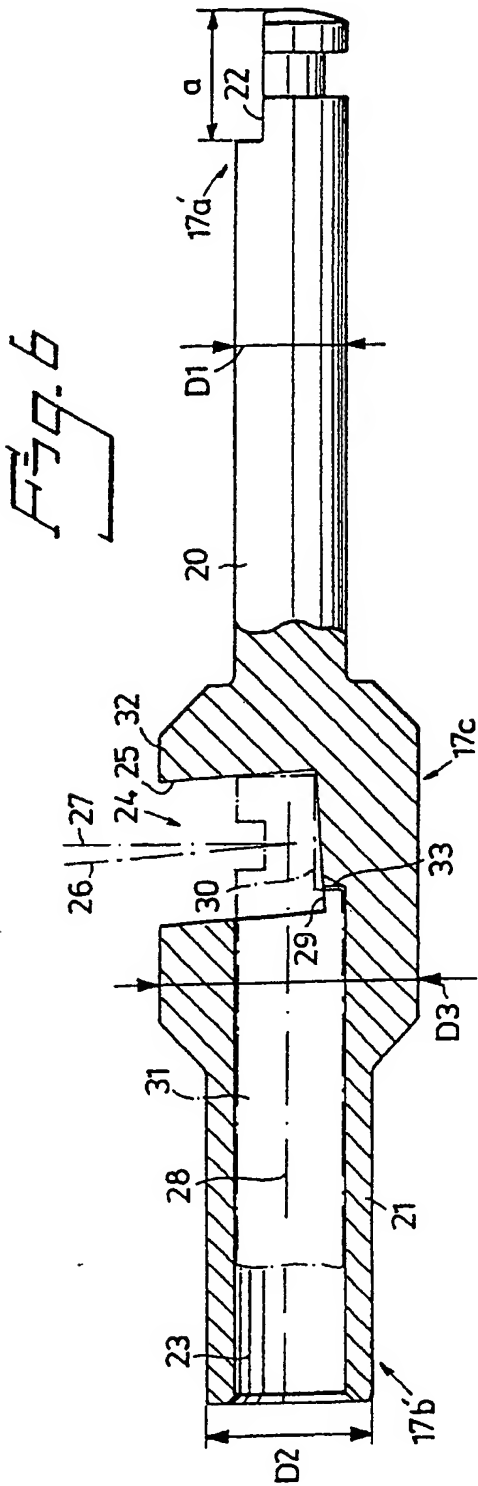
9. Appliance according to any one of patent claims 4-8, characterized in that the bearing recess (23)

10. Appliance according to patent claim 9, characterized in that the inclined actuation surface merges into a radially extending segment-shaped surface (33) at the bottom parts of the segment-shaped recess/opening.

EP 0 454 639 A1



EP 0 454 639 A1



EP 0 454 639 A1

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EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 91850060.4
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	<u>GB - A - 2 058 615</u> (WEISSMANN) * Fig. 1-12 *	1	A 61 C 1/14 B 23 B 51/12
A	---	5, 8	
A	<u>GB - A - 2 068 788</u> (WEISSMANN) * Fig. 1-8; abstract *	1, 5, 8	
A	<u>FR - A - 992 985</u> (MANNESCHI) * Fig. 3, 4 *	1, 2, 3, 4, 6	
A	<u>DE - A1 - 3 715 659</u> (GOTTLIEB GUHRING KG) * Fig. 4, 5, 6 *	1, 2	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A 61 C 1/00 A 61 C 3/00 B 23 B 51/00 B 23 B 31/00 B 23 Q 3/00
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
VIENNA		26-04-1991	BRÄUER
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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